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## A GREAT NATURALIST.

*My Life: a Record of Events and Opinions.* By Alfred Russel Wallace. Vol. i., pp. xii+435; vol. ii., pp. viii+459. With facsimile letters, illustrations, and portraits. (London: Chapman and Hall, Ltd., 1905.) Price 25s. net.

EVERYONE will be glad that the Nestor of the evolutionist camp has been able himself to tell us the story of his life. It has been a long life of over fourscore years, full of work, rich in achievement, starred with high ideals, and the story of it must have been pleasant to write as it is pleasant to read. It has been many-sided to a greater degree than that of most scientific investigators, for Alfred Russel Wallace has always had more than professional irons in the fire, and has always been as much interested in practising biology as in theorising about it. At the editor's request we have confined our attention, however, to what the author tells us of his work as naturalist and biologist, though it is difficult, and not altogether legitimate perhaps, to abstract off one aspect of a life in this fashion.

There does not seem to have been anything definable in Wallace's inheritance to account for his becoming a great naturalist. Nor was there much in his nurture to lead him in that direction except that he was country-bred in beautiful and interesting places. Thrown early on his own resources to make his way in life, he began when about fourteen to work at surveying—in which Herbert Spencer had also his early discipline—and it was in trying to understand his instruments and the earth he measured that he first became scientific. He tells us that in his solitary rambles, nature gradually laid hold of him, claiming to be understood as well as enjoyed. From the stars and the earth his interest spread to flowers, and, with the help of Lindley's "Elements" and Loudon's "Encyclopædia of Plants," he became a keen field-botanist. He began to feel "the joy which every discovery of a new form of life gives to the lover of nature," and this was the turning-point of his life.

During a year of school-teaching at Leicester (1844), Wallace got to know Bates, who made him an enthusiastic entomologist, "opening a new aspect of nature," and he also read Malthus's famous essay, "without which I should probably not have hit upon the theory of natural selection." Another book that impressed him was Humboldt's "Personal Narrative of Travels in South America," which awakened a desire to visit the tropics, a desire soon strengthened by Darwin's "Voyage of the *Beagle*." It is interesting to find that as early as 1845 Wallace was speculating upon the origin of species, and had a warm appreciation of the "Vestiges of the Natural History of Creation."

Early in 1848, when he was twenty-five, Wallace set out, along with Bates, to explore and collect on the Amazon, and on the tale of his adventures, long since

told, the "Life" throws some sidelights. There is a vivid description of the disastrous fire on board the rubber-laden ship which brought Wallace part of the way home in 1852. The holocaust of all his treasures was hard to bear, but what had been sent on during his journey, and those notes and drawings which were saved from the fire, sufficed to lay the foundations of his scientific reputation, and, perhaps, as he says, the disaster was, for him, a blessing in disguise, for it made him continue his *Wanderjahre*.

The "central and controlling" chapter in Wallace's life was his eight years' wandering throughout the Malay Archipelago, the story of which has fascinated many thousands of readers. He had found his vocation, and enthusiasm grew upon him. "Who ever," he wrote, "did anything good or great who was not an enthusiast?" The love of solitude grew upon him; it was so "very favourable to reflection." For though he was earning a competency by collecting, and though his knowledge of many groups of animals became expert, he was always pondering over big problems, and some of his friends at home shook their heads at his "theorising." "The problem of the origin of species was rarely absent from his thoughts," and at Sarawak, in 1855, he wrote what Huxley called a "powerful essay" on "The law which has regulated the introduction of new species"—a hint of what was coming. At Ternate, in 1858, when ill with intermittent fever, he began thinking over what he had learned from Malthus, and the theory of natural selection "suddenly flashed upon him." He wrote straight off to Darwin, and everyone knows how the two papers were read on the same day at the Linnean Society, and how the two discoverers were united in a friendship than which there has been nothing finer in the history of science.

From 1862 to 1871 Mr. Wallace lived in London, and the "Life" gives an account of his scientific and literary labours, and interesting glimpses of many scientific men whom he came to know, such as Lyell, Spencer, Huxley, W. B. Carpenter, and St. George Mivart. He tried for various posts, e.g. the secretaryship of the Royal Geographical Society (which Mr. Bates obtained), and the guardianship of Epping Forest (in connection with which he had some luminous ideas), but he was left free to continue his literary and scientific work, and to try to make things better for his country. Soon after his marriage, in 1866, he began to migrate by stages into the country—to Grays (where he wrote his "Geographical Distribution"), to Croydon (where he wrote his "Island Life"), to Godalming, to Parkstone, and was able to live quietly on his earnings and on a well-merited Civil List pension. Apart from his tour in America, where he gave the Lowell lectures in 1886, occasional holidays, e.g. at Davos, and occasional unprofitable scrimmages, his life was very uneventful, as men count events. By nature quiet, gentle, and reflective, he had no ambitions save for truth and justice; he was satisfied with plain living and high thinking, and the esteem of all who really knew him. Thus for many years he has cultivated his garden and served his fellow-men.

The "Life" contains many interesting appreciations of other naturalists, but we must confine ourselves to the relations between Darwin and the author. From his solitude in Malay Wallace wrote home in regard to "The Origin of Species":—

"I have read it through five or six times, each time with increasing admiration. It will live as long as the Principia of Newton. Mr. Darwin has given the world a new Science, and his name should, in my opinion, stand above that of every philosopher of ancient and modern times."

To Mr. Bates he wrote:—

"I do honestly believe that with however much patience I had worked and experimented on the subject, I could *never have approached* the completeness of his book, its vast accumulation of evidence, its overwhelming argument, and its admirable tone and spirit. I really feel thankful that it has *not been left* to me to give the theory to the world."

As everyone knows, Wallace parted company with Darwin over the possibility of giving a "natural history" interpretation of man's highest qualities, and in one of his letters Darwin expressed the fear that his selectionist interpretation would quite kill him in Wallace's good estimation. But the author writes:—

"I never had the slightest feeling of the kind he supposed, looking upon the difference as one which did not at all affect our general agreement, and also being one on which no one could dogmatise, there being much to be said on both sides."

Wallace also differed from Darwin in regard to the reality of sexual selection through female choice, as to the distribution of Arctic plants in south temperate regions, as to the feasibility of the provisional hypothesis of pangenesis, and as to the transmissibility of acquired character. On the whole, however, he admits that those critics are not far wrong who describe him as more Darwinian than Darwin, and even in the title of one of his most effective books he persisted in his magnanimous subordination of himself. The fact is, the friends were too keen in the pursuit of truth to trouble about the boundaries of their personal credit. Neither begrudged the other his due meed of praise. Thus, if we may quote once more, we find Darwin writing to Wallace:—

"I hope it is a satisfaction to you to reflect—and very few things in my life have been more satisfactory to me—that we have never felt any jealousy towards each other, though in some sense rivals. I believe I can say this of myself with truth, and I am absolutely sure that it is true of you."

In addition to his statement of the theory of natural selection, his travels, and his work on distribution, Mr. Wallace has in many ways enriched natural history in the wide sense. There is his theory of the "warning colours" of inedible insects, his theory of the correlation between the colours of female birds and the nature of the nest, his theory of "recognition-marks," his criticism of sexual selection by choice on the female's part, his argument that much that is called "instinctive" is due to instruction and imitation, his conclusions as to the Arctic elements in south temperate floras, his emphasis on mouth-gesture as a factor in the origin of language, his

strong opinions as to the part natural selection has played and still plays in the social evolution of mankind. We might mention other contributions—as to the permanence of oceanic and continental areas, as to the causes of glacial epochs, as to the glacial erosion of lake-basins, as to the affinities of the Australian aborigines—but we have said enough. It may be of interest, however, to notice that while Wallace many years ago sided with Weismann, he cannot see his way to recognise the validity of the recent theories of discontinuous variation and mutation.

In thinking of the work of Alfred Russel Wallace, we see him as a "synthetic type," combining the virtues of the old naturalist traveller with those of the modern biologist. On the one hand, we see him with a rich experience of the forms and species of animal life, their distribution, habits, and inter-relations, but with a wide outlook, equally interested in palms and orchids, lakes and mountains. With "a positive distaste for all forms of anatomical and physiological experiment," he never took to any of the usual methods of analysis, and even when he was most pre-occupied with species he tells us that he was determined not to become a specialist. So, on the other hand, we see him from first to last as a generaliser, "inquisitive about causes," intent upon "solving the problem of the origin of species," and contributing much thereto. His "Life" also discloses what many have had the privilege of knowing—the delightful personality of one who has had the honour of being "Darwinii æmulum, immo Darwinium alterum," and no ætiologist merely, but a warm-hearted humanist thinker, a fearless social striver, and one who realises the spiritual aspect of the world. He has the satisfaction of a retrospect on a long and happy life of work.

J. A. T.

#### A HIGHER TEXT-BOOK OF ELECTRICITY AND MAGNETISM.

*Magnetism and Electricity for Students.* by H. E. Hadley. Pp. x+575. (London: Macmillan and Co., Ltd., 1905.) Price 6s.

THE object of this volume is to carry students a stage further than that reached in the author's "Magnetism and Electricity for Beginners." It has been written in response to numerous requests from teachers. Its scope is roughly that of a second- or even third-year college course. Elementary differential and integral calculus is employed, but even this is avoided whenever reasonably practicable. Technical applications are dealt with in a minor way only, the author considering, rightly in our opinion, that they are best relegated to a special treatise.

Turning to the detailed treatment we find many things to attract us. The method adopted for describing electrical phenomena may be alluded to as the "lines of force method." There are a large number of carefully thought out diagrams showing the play of Faraday tubes in various cases. These are in the main very accurate and suggestive as sketch diagrams. In Fig. 112, however—illustrative